METALLURGICA VENETA
ACCIAI SPECIALI

Certified Company

1.2344

Quality	X40CrMoV5-1	Supply conditions:
According to standards	UNI EN ISO 4957: 2002	Annealed
Number	**1.2344**	

Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%	V%
0,35-0,42	0,80-1,20	0,25-0,50	0,030	0,020	4,80-5,50	1,20-1,50	0,85-1,15
± 0.02	± 0.05	± 0.04	+ 0.005	+ 0.005	± 0.10	± 0.05	± 0.05

Product deviations are allowed

Temperature °C

Hot-forming	Quenching	Tempering see table	Stress-relieving	Stress-relieving must be done after machining and before quenching
1050-900	heating up to 800, pause, then 1020-1080 oil, polymer, s.b.	immediately after quenching minimum **2 cycles**	600-650 furnace cooling to 350, then air	

Soft annealing	Isothermal annealing	Pre-heating welding	Stress-relieving after welding
820 furnace cooling (HB max 229)	880 furnace cooling to 780, pause, then furnace cooling to 750, then air	350	650 furnace cooling

Ac1	Ac3	Ms	Mf
830	915	300	80

s.b. = salt bath (450-500 °C)

Mechanical properties

Tempering table after quenching at 1040 °C in oil. Values on Ø 20 mm

HB	560	543	525	512	504	512	525	543	577	577	512	455	390	301
HRC	55	54	53	52	51.5	52	53	54	56	56	52	48	42	32
N/mm²	2070	2010	1950	1880	1850	1880	1950	2010	2160	2160	1880	1640	1340	1010
Tempering at **°C**	**50**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**

Thermal expansion	$10^{-6} \cdot K^{-1}$	10.0	10.7	10.8	11.3	11.8	12.3	12.7	13.0	13.2
Modulus of elasticity	long. GPa			210	205	198	191	182	173	
Specific heat capacity	J/(Kg•K)			461	479	499	517	536	558	587
Thermal conductivity	W/(m•K)			19.2	20.1	22.4	24.0	25.1	25.8	26.1
Density	Kg/dm³			7.74						
Specific electric resist.	Ohm•mm²/m			0.543	0.638	0.705	0.782	0.868	0.96	1.06
R hard. and tempered for	N/mm²			**1600**			1400	1300	1100	800
Rp 0.2	N/mm²			1460			1200	1100	900	600
R hard. and tempered for	N/mm²			**1200**			1120	1000	850	580
Rp 0.2	N/mm²			1060			900	800	650	420
Testing at	**°C**	**-100**	**0**	**20**	**100**	**200**	**300**	**400**	**500**	**600**

Nitriding in gaseous ammonia. The material should be hardened and tempered at min. 580 °C before nitriding

Temperature **°C**	Time **h**	Depth of hardening **mm**	Surface hardness **HV**
525	10	0,125	1000 - 1250
525	20	0,180	1000 - 1250
525	40	0,250	1000 - 1250
525	60	0,300	1000 - 1250

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Tool steel for high-working temperatures

- good resistance to thermal shock and heat cracking
- good mechanical characteristics and toughness in hot condition, constant hardness throughout the production cycle
- excellent machinability, high micro-purity level, good suitability for polishing and photo-engraving
- possibility to carry out welding operation with TIG (Tungsten Inert Gas) or MMA (Manual Metal Arc) methods
- possibility of coating with PVD or PA/CVD methods, flame/induction hardening and nitriding
- applications*: dies for aluminium die-casting, dies subject to low pressure, chill moulds for gravity casting, containers for die-casting presses, dies for aluminium extrusion, extrusion press blocks, sleeves for extrusion, injection moulds*